

**California Environmental Protection Agency**

---



**Air Resources Board**

**Staff Report:  
Initial Statement of Reasons**

**Proposed Amendments to the  
Clean Fuels Regulations  
Regarding Clean Fuel Outlets**

**Release Date: June 4, 1999**

**State of California  
California Environmental Protection Agency  
AIR RESOURCES BOARD  
Stationary Source Division**

**STAFF REPORT: INITIAL STATEMENT OF REASONS**

**Public Hearing to Consider Amendments to the Clean Fuels Regulations  
Regarding Clean Fuel Outlets**

**Date of Release: June 4, 1999  
Scheduled for Consideration: July 22, 1999**

**Location:**

**Bay Area Air Quality Management District  
Board Hearing Room, Seventh Floor  
939 Ellis Street  
San Francisco, California 94109**

**This report has been reviewed by the staff of the Air Resources Board and approved for publication. Approval does not signify that the contents necessarily reflect the views and policies of the Air Resources Board, nor does mention of trade names or commercial products constitute endorsement or recommendation for use. To obtain this document in an alternative format, please contact the Air Resources Board ADA Coordinator at (916) 322-4505, TDD (916) 324-9531, or (800) 700-8326 for TDD calls from outside the Sacramento area. This report is available for downloading from Air Resources Board's Internet site for this rulemaking at <http://www.arb.ca.gov/regact/clnfuels/clnfuels.htm>.**

## **ACKNOWLEDGMENTS**

**This report was prepared with the assistance and support of the Mobile Source Control Division. We would also like to acknowledge the participation and assistance from the California Energy Commission.**

### **Principal Authors:**

Erik White  
Jose Gomez

### **Office of Legal Affairs**

Tom Jennings

### **Contributing Staff:**

Jacqueline Wilson

### **Reviewed and Approved By:**

Peter D. Venturini, Chief, Stationary Source Division  
Dean C. Simeroth, Chief, Criteria Pollutants Branch  
Gary M. Yee, Manager, Industrial Section

## **TABLE OF CONTENTS**

## INTRODUCTION AND SUMMARY

A. What Are the Existing Requirements? .....	1
B. What is the Status of the California Alternative Fuel Low-Emission Vehicle Fleet and Infrastructure? .....	2
C. Why Are Changes to the Clean Fuels Regulations Necessary? .....	2
D. What Are the Proposed Amendments? .....	3
E. How Were the Proposals Developed? .....	5
F. What Are the Effects of the Proposed Amendments? .....	6

RECOMMENDATION .....	7
----------------------	---

## BACKGROUND

A. Existing Regulations .....	9
B. Status of California's Alternative Fuel Low-Emission Vehicle Fleet .....	12
C. Status of Existing Alternative Fuels Infrastructure .....	15

## PROPOSED AMENDMENTS

A. Eliminate Obsolete Sections .....	19
B. Calculation of the Required Number of Clean Fuel Outlets .....	19
C. Modification of Fleet Vehicle Discount and Required Number of Clean Fuel Outlets by the Executive Officer .....	22
D. Reporting Requirements .....	24
E. Amenity Requirements .....	24
F. Sunset Provisions .....	25

## ENVIRONMENTAL AND ECONOMIC IMPACTS

A. Environmental Impacts .....	27
B. Cost Impacts .....	27
C. Small Business Impacts .....	28
D. Global Warming and Ozone Depletion Impacts .....	28

## REFERENCES

## APPENDICES

A. Proposed Regulation Order	
B. Alternative Fuel Low-Emission Vehicles Delivered for Sale in California	
C. Compressed Natural Gas (CNG) Fueling Facilities in California	
D. Methanol (M85) Fueling Facilities in California	
E. Liquefied Petroleum Gas (LPG) Fueling Facilities in California	
F. Potential Effects of The Proposed Amendments To The Clean Fuels Regulations	

## **I.**

### **INTRODUCTION AND SUMMARY**

This report is the Initial Statement of Reasons by the staff of the Air Resources Board (ARB or Board) to support amendments to the Clean Fuels Regulations (Title 13, California Code of Regulations, sections 2300 - 2317) regarding clean fuel outlets. The proposed amendments will remove obsolete sections, modify the way the number of required clean fuel outlets would be determined and streamline notification to affected parties. The proposed amendments will be considered at a Board hearing on July 22, 1999.

#### **A. What Are the Existing Requirements?**

In 1990, the Board adopted the Clean Fuels Regulations to ensure that clean alternative fuels used to certify low-emission vehicles (LEVs) would be publicly available. The Clean Fuels Regulations require certain owners/lessors of retail gasoline stations to equip an appropriate number of their stations to dispense a designated clean fuel if 20,000 or more vehicles are certified in California to a LEV standard on a clean fuel. The Board chose 20,000 as the vehicle trigger since it represented a clean fuel throughput volume that allowed for a reasonable return on investment. When the 20,000 vehicle trigger is met for a specific fuel, the number of required clean fuel outlets is determined. This determination is made through a series of calculations that consider the public (non-fleet) LEV fuel demand, clean fuel outlet average annual throughput, and the number of retail gasoline service stations owned or operated by owner/lessors of retail gasoline stations.

Affected owners/lessors are determined based upon the number of retail gasoline stations they own or operate in the State. Owner/lessors that own a large number of retail gasoline outlets will be first affected by the regulations. Affected owners/lessors are required to install a certain number of clean fuel outlets based on the number of retail gasoline stations they own or operate. For example, assuming the 20,000 vehicle trigger is met and all the vehicles are non-fleet vehicles, then approximately 35 clean fuel outlets would be required. In this case, any retail gasoline station owner/lessor who operated more than about 350 stations in the State would be required to site a certain number of clean fuel outlets.

Affected owners/lessors may comply with their clean fuel outlet requirements in any of three ways. Owners/lessors who own existing public alternative fueling facilities that meet the clean fuel outlet criteria may use their facilities to meet their obligation to site a clean fuel outlet. They may elect to site new clean fuel outlets. Finally, they may enter into agreements with individuals who own existing qualifying public alternative

fueling facilities to allow those facilities to be used exclusively by the affected party to meet the clean fuel outlet requirements. This is known as “constructive allocation.”

The ARB staff is required to notify affected gasoline retailers 18 months and again 12 months in advance of each year when clean fuel outlets are required. Clean fuel outlets must be installed and operational January 1 of the year in which they are required.

There are various other provisions within the Clean Fuels Regulations pertaining to criteria each clean fuel outlet must meet (including minimum fueling rates, amenities, public accessibility and fuel availability), as well as reporting requirements affecting retail gasoline outlet owners/lessors, motor vehicle manufacturers, fleet operators and clean fuel distributors. The regulations contain no sunset provisions.

## **B. What is the Status of the California Alternative Fuel Low-Emission Vehicle Fleet and Infrastructure?**

Automobile manufacturers have produced alternative fuel vehicles to run on compressed natural gas (CNG), liquefied petroleum gas (LPG), and methanol (M85) that have been certified to California’s LEV standards and sold within the State. Currently, these vehicles total 1,100 LPG vehicles, 7,200 CNG vehicles, and 11,500 M85 vehicles within California. These vehicles have predominately been produced and marketed to meet the needs of fleet operators. However, it is expected that within the next five to seven years, automobile manufacturers will begin producing a significant number of fuel cell powered vehicles that will operate on alternative clean fuels. It is likely that these vehicles will be marketed to both fleet operators and the general public.

There are currently very few publicly available locations in California where motorists can refuel their alternative fuel vehicles. These locations total less than five percent of the number of retail gasoline stations in the State, and most facilities are not open to the public. However, there are a limited number of public fueling facilities in California for CNG, LPG and M85. The number of these public fueling facilities for CNG and LPG has remained stable over the last few years, while facilities dispensing M85 have decreased dramatically as the use of this fuel has declined.

## **C. Why Are Changes to the Clean Fuels Regulations Necessary?**

It is appropriate to update the Clean Fuels Regulations to reflect the current state of the alternative fuel vehicle market. When the regulations were adopted, it was expected that alternative fuels would be the primary fuels used by automobile manufacturers to meet California’s stringent LEV and ultra-low emission vehicle (ULEV) standards. However, automobile manufacturers today are primarily meeting California’s

LEV (including ULEV) requirements using California reformulated gasoline. Automobile manufacturers have accordingly produced and delivered fewer numbers of alternative fuel LEV vehicles for sale in California than was expected when these regulations were adopted. In addition, most alternative fuel LEVs that have been produced are currently owned and operated by fleets which utilize central fueling facilities.

It is also appropriate to remove obsolete sections of the regulations that pertain solely to the clean fuel outlet requirements in the South Coast Air Quality Management District (SCAQMD) for the years 1994 through 1996. These requirements were never implemented because the vehicle trigger was never reached during those years.

Further, it is appropriate to streamline the reporting requirements of the regulations for both the ARB staff and for the affected industries. The current biannual notification by the ARB staff of the number of clean fuel outlets required is redundant and confusing. Also, it is not necessary to collect information annually from the affected industries until such time as the vehicle trigger is predicted to be reached.

Finally, it is appropriate to update the regulations to reduce the potential costs for affected parties. The existing regulations do not take into account the existing fueling infrastructure by excluding public alternative fueling facilities that do not meet the amenity requirements. Allowing the use of these facilities and the simplification of the amenity requirements should make it more economical for affected parties to comply with the regulations.

#### **D. What Are the Proposed Amendments?**

Several amendments to the Clean Fuels Regulations are being proposed. These amendments are summarized below.

##### *1. Minor Modifications*

The proposed amendments would repeal the obsolete sections of the Clean Fuels Regulations that refer to the SCAQMD for the years 1994 through 1996. In addition, the proposed amendments would delay the reporting requirements for retail gasoline outlet owners/lessors, fleet operators, and clean fuel distributors until such time as they are needed to implement the regulations. They would also change the ARB staff's annual notification to affected parties regarding the requirements for new clean fuel outlets to once per year, with an October 31 notification deadline.

##### *2. Determination of the Required Number of Clean Fuel Outlets*

The proposed amendments would modify how the number of clean fuel outlets required each year would be determined. The proposed amendments would change the method used to count the number of vehicles qualifying towards the 20,000 vehicle trigger by discounting fleet vehicles by 75 percent since fleet operators typically provide their own fueling infrastructure. However, this discount can be reduced by the ARB Executive Officer if information indicates that the discount should be less. In addition, any person or organization may request the ARB Executive Officer to revise the trigger discount or determination based on additional information. Once the vehicle trigger is met, the vehicles that are counted in the vehicle trigger would then be considered in determining the number of clean fuel outlets required. This could provide more clean fuel outlets than the existing regulations require. In addition, the proposed amendments would no longer discount by ten percent the LEV fuel demand for flexible fuel/dual-fuel LEV vehicles since it is more appropriate to consider the fueling patterns of these vehicles when the new fueling outlets are required.

The proposed amendments would calculate the total required number of clean fuel outlets based on an average annual outlet throughput of 300,000 gasoline equivalent gallons (geg). This will at least double the number of clean fuel outlets required during the early years of the program. When five percent of the retail gasoline stations have been equipped to dispense the clean fuel, the average annual outlet throughput volume would be increased to 600,000 geg for determining the number of additional outlets. This action would reinstate the original intent of the regulations to site more clean fuel outlets during the early years of the program.

The proposed amendments would allow existing public alternative fuel facilities meeting amenity requirements and not owned by affected parties to be subtracted from the total number of required clean fuel outlets. Affected parties would continue to be given credit for both the early introduction of clean fuel outlets and the existing mandated clean fuel outlets they have already sited. Facilities subtracted from the required number of clean fuel outlets required statewide would then not be eligible for constructive allocation by affected parties.

### *3. Modification of the Required Number of Clean Fuel Outlets by the Executive Officer*

The proposed amendments would add provisions that would allow the ARB Executive Officer to adjust the calculated number of required clean fuel outlets up or down based on evidence that the calculated number of clean fuel outlets will not meet the fueling demand. The ARB Executive Officer would be limited in the adjustment of the required number of clean fuel outlets to within a maximum and a minimum level. The maximum level would be based on the LEV clean fuel demand for all clean fuel LEVs



operating on the clean fuel without discounting the fleet vehicles. The minimum level would be based on the LEV clean fuel demand for only dedicated clean fuel vehicles in non-fleet use. In addition, any person or organization would be able to submit factual information, including the utilization of the clean fuel outlets, that would allow the ARB Executive Officer to consider additional adjustments, between the same maximum and minimum, to the clean fuel outlet determination.

#### *4. Miscellaneous Amendments*

The proposed amendments would revise the schedule for siting new clean fuel outlets to maintain the existing period of time after notification that affected owners/lessors have to site new clean fuel outlets. New clean fuel outlets would need to be operational by April 30 of the year the vehicle trigger is predicted to be met, instead of the January 1 deadline in the existing regulations. This is 18 months from the date ARB staff will have notified affected parties of the number of new clean fuel outlets required.

The proposed amendments would change the amenity requirements to allow more existing public and private alternative fuel facilities to qualify as clean fuel outlets. The proposed changes would simplify the amenity requirements by eliminating unnecessary requirements (e.g., employee training requirements, fueling attendants), and would differentiate the requirements between clean fuel outlets located at retail gasoline stations and clean fuel outlets where gasoline is not offered for retail sale.

Finally, the proposed amendments would add a sunset provision that would remove the requirements to install clean fuel outlets for a clean fuel when 10 percent of the retail gasoline stations in the State have made that clean fuel available for purchase.

#### **E. How Were the Proposals Developed?**

In developing the proposed amendments, ARB staff conducted public workshops on November 10, 1998 and March 18, 1999. The first workshop was to solicit comments on the need to modify or rescind the Clean Fuels Regulations, according to the criteria of the Governor's Executive Order W-144-97 on the sunset review of regulations. The workshop notice was mailed to approximately 2,200 companies, organizations and individuals. Comments were received on the need to modify and update the regulations. The second workshop was to solicit specific comments on proposed changes to the regulations. The second workshop notice was mailed to 7,200 individuals and organizations, and comments were supportive of the ARB staff's efforts to improve the regulations. ARB staff also held several meetings with industry associations, environmental groups and other government agencies. As a result of the March workshop and meetings, ARB staff have modified the proposed amendments based

on some of the comments received.

## **F. What Are the Effects of the Proposed Amendments?**

By discounting that portion of the LEV vehicles that are fleet operated, the proposed changes could result in a delay in the date that the 20,000 vehicle trigger would be met. The amount of time that the vehicle trigger would be delayed by this change is unknown at this time, and would vary from fuel to fuel based on fueling patterns and ownership profiles (fleet vs. non-fleet). However, it is proposed to allow the ARB Executive Officer to reduce the discount in the vehicle trigger calculation for fleet operated vehicles, which may reduce the delay in reaching the vehicle trigger. Appendix F shows hypothetical examples of how the vehicle trigger could be delayed, from one to four years, for different fleet ownership profiles.

Since the proposed amendments would lower the average annual outlet throughput by half, this would result in about twice as many clean fuel outlets being required per year when the vehicle trigger is met compared to the existing regulations. The proposed amendments also authorize the ARB Executive Officer to adjust the required number of clean fuel outlets in consideration of potential fueling demand, which may increase or decrease the number of clean fuel outlets required.

The proposed changes should result in no additional costs and would likely provide some cost savings to affected owners/lessors. This would result from more accurately accounting for fleets in the vehicle trigger calculation, considering existing public fuel outlets when determining the number of clean fuel outlets required, and relaxing the amenity requirements, thereby allowing more existing locations to qualify as clean fuel outlets. These changes should reduce the cost of siting new clean fuel outlets since fewer new clean fuel outlets would be required. The proposed amendments also contain sunset provisions that would eliminate the Clean Fuels Program for an individual clean fuel when ten percent of the retail gasoline stations in the State offer that fuel for retail sale. Also, delaying the reporting requirements to retail gasoline station owners/lessors, fleet operators and clean fuel distributors will reduce the associated costs of reporting in the years prior to the vehicle trigger being met.

## **II.**

### **RECOMMENDATION**

It is recommended that the Board adopt the proposed amendments to the Clean Fuels Regulations attached as Appendix A.



### **III.**

## **BACKGROUND**

This chapter presents background information on the existing Clean Fuels Regulations, the current and future alternative fuel LEV fleet, and the existing alternative fuel infrastructure in California.

#### **A. Existing Regulations**

The Clean Fuels Regulations, contained in Title 13, CCR sections 2300-2317, were adopted in a 1990-1991 rulemaking and became effective in September 1991. At that time, there was an expectation that clean alternative fuels would play a key role in enabling automobile manufacturers to certify vehicles to the stringent LEV standards. The Board adopted the Clean Fuels Regulations to assure that clean alternative fuels used to certify LEVs are readily available for customer operation of those vehicles.

##### *1. Overview*

The regulations require that certain owner/lessors of retail gasoline stations equip an appropriate number of their stations to dispense a designated clean fuel if a specified number of vehicles are expected to be certified on that clean fuel. The regulations provide that there will be no required retail clean fuel outlets for a designated clean fuel, for a given year, unless the number of LEVs projected to be equipped to operate on that fuel statewide is 20,000 or greater (sections 2304(a)(1); 2305(c).) If the 20,000 vehicle trigger is met, the regulations specify a formula by which the number of clean fuel outlets required will be determined (section 2304). Currently, the trigger has not been met and no requirement for clean fuel outlets has been mandated. The ARB staff are required to provide a preliminary estimate for the number of clean fuel outlets needed 18 months prior to the start of each year and a final estimate 12 months prior to the start of each year.

##### *2. Description of the Clean Fuel Regulations*

The Clean Fuel Regulations include retail outlet, retail availability, marketing, supply and reporting requirements. These elements of the regulations are discussed below.

#### a. Retail Outlet Requirements

The retail outlet requirements state that certain owner/lessors of retail gasoline stations must equip an appropriate number of stations to dispense each clean fuel. According to the definition in section 2300, where an oil company owns, leases or controls an outlet and either operates the station or has a franchise agreement with the operator, then the oil company is the owner/lessor.

Section 2303 directs the ARB staff to determine the projected maximum volume of each clean fuel for each calendar year, starting with 1994. This projection is based upon an estimate of the number of LEV vehicles certified per year on each clean fuel. The ARB staff makes a preliminary estimate of each fuel's projected maximum volume at least 18 months before the start of each calendar year, and makes a final estimate at least 12 months before the start of each year (section 2307). The total number of retail outlets required for each clean fuel in a given year is derived from a formula, set forth in section 2304. In no case will outlets for a clean fuel be required unless 20,000 or more vehicles are expected to be certified on that clean fuel.<sup>1</sup> This is known as the vehicle trigger.

The formula in section 2304 for determining the necessary number of clean fuel outlets for each year includes factors for the total fuel demand for each clean fuel, a specified average annual outlet throughput and various adjustments for fleets, vehicle conversions and dual-fuel and FFV vehicles. For example, assuming the 20,000 vehicle trigger is met and all the vehicles are non-fleet vehicles, the formula would result in 35 clean fuel outlets being required. The formula also allows adjusting for existing public alternative facilities on a limited basis.

Section 2305 establishes a process for allocating the required total number of clean fuel outlets among station owner/lessors. Owner/lessors of more than a minimum number of retail gasoline stations (as defined in section 2306) will be required to equip an assigned number of their stations to dispense clean fuels. For example, for the same 20,000 vehicles assumed above, any retail gasoline station owner/lessor who operated more than about 350 stations in the State would be required to site a certain number of clean fuel outlets.

Section 2308 allows a person who has equipped an alternative fuel retail dispensing facility to "constructively allocate" it to a gasoline retailer for purposes of

---

<sup>1</sup> Dual-fuel and FFV vehicles that are certified to a more stringent emission standard on a clean fuel than on gasoline are considered "step-certified." Section 2303(d) provides that only dual-fuel and FFV vehicles that are step-certified are counted towards the vehicle trigger.

complying with the requirements for equipping retail gasoline outlets. Pre-existing CNG outlets counted among the required number of outlets cannot be constructively allocated.

Under section 2309(a), gasoline station owner/lessors must provide a reasonable geographical dispersion of assigned clean fuel outlets and place the outlets in locations that are convenient to drivers of LEVs that operate on the particular clean fuel.

Owners/lessors who have received preliminary estimates of their required number of clean fuel outlets must submit proposed locations of outlets to the ARB, along with optional locations equal to at least 20 percent of the required number. These must be submitted 15 months before the outlets have to be operational. Owner/lessors must then consult with the staff of the ARB and California Energy Commission (CEC) regarding optimal locations. Final locations must be reported 12 months in advance.

#### b. Retail Availability Requirements

The operator of any required clean fuel outlet must store a commercially reasonable volume of the fuel at the outlet and offer it for sale to the public at all times gasoline is being offered for sale. These requirements are found in section 2310(a).

#### c. Marketing Requirements

Both the clean fuel outlet owner/lessor and the operator must comply with various requirements, found in sections 2309(b) and 2310, intended to assure that the clean fuel is marketed as attractively as the gasoline at the outlet. These are known as the “amenity requirements.” The owner/lessor of a clean fuel outlet must, compared to the gasoline at the outlet, assure that the clean fuel dispensers: have similar accessibility and visibility; are substantially as well marked and identified; are substantially as well lit at night; and provide substantially the same access to customer services.

Certain affected gasoline station owner/lessors must provide a training program for attendants that teaches them to answer customers' questions about the clean fuels, or must provide a functionally equivalent alternative. Operators of clean fuel outlets whose owner/lessor must provide a training program are required to have trained attendants on hand or implement a functionally equivalent program.

#### d. Supply Requirements

Section 2309(c) makes the owner/lessor jointly liable with the clean fuel outlet operator for a failure to have clean fuels available for sale at the outlet. The potential joint

liability is triggered by the operator's request that the owner/lessor provide for the delivery of reasonable quantities of fuel on commercially reasonable terms, not less than 72 hours later, and the owner/lessor's failure to satisfy the request.

e. Reporting Requirements

Sections 2312 and 2313 require owner/operators of retail gasoline stations and fleet operators, respectively, to submit annual reports to the ARB. Distributors of clean fuels must submit quarterly production and importation reports, as specified in section 2314.

**B. Status of California's Alternative Fuel Low-Emission Vehicle Fleet**

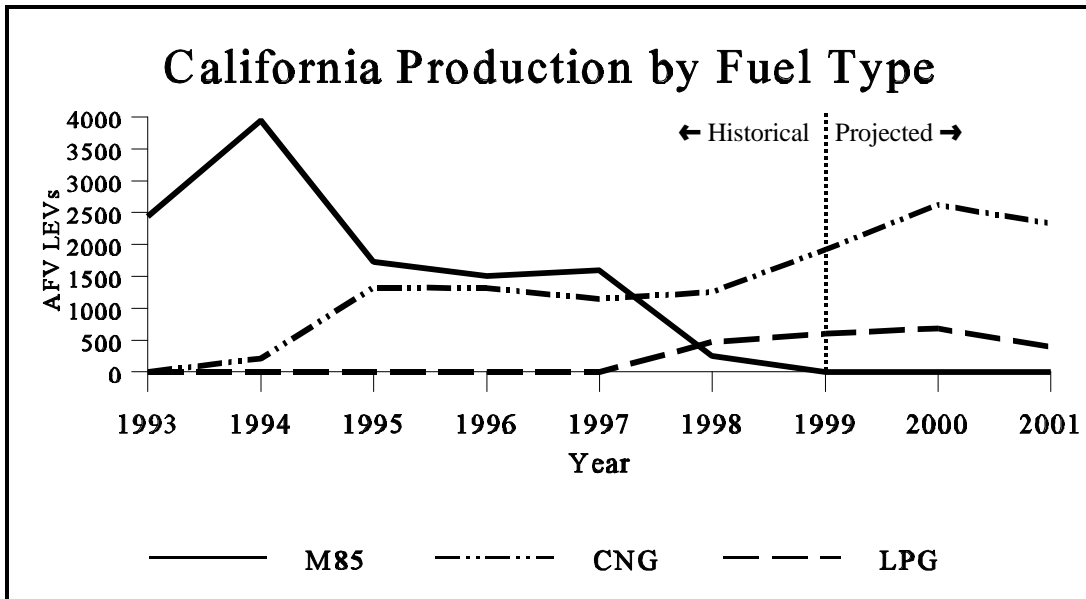
While the existing alternative fuel LEV vehicle fleet is below the trigger level specified in these regulations, it is estimated that within five to seven years, a significant number of alternative fuel vehicles meeting the LEV standards will be operating in California.

*1. Existing Alternative Fuel Low Emission Vehicle Fleet*

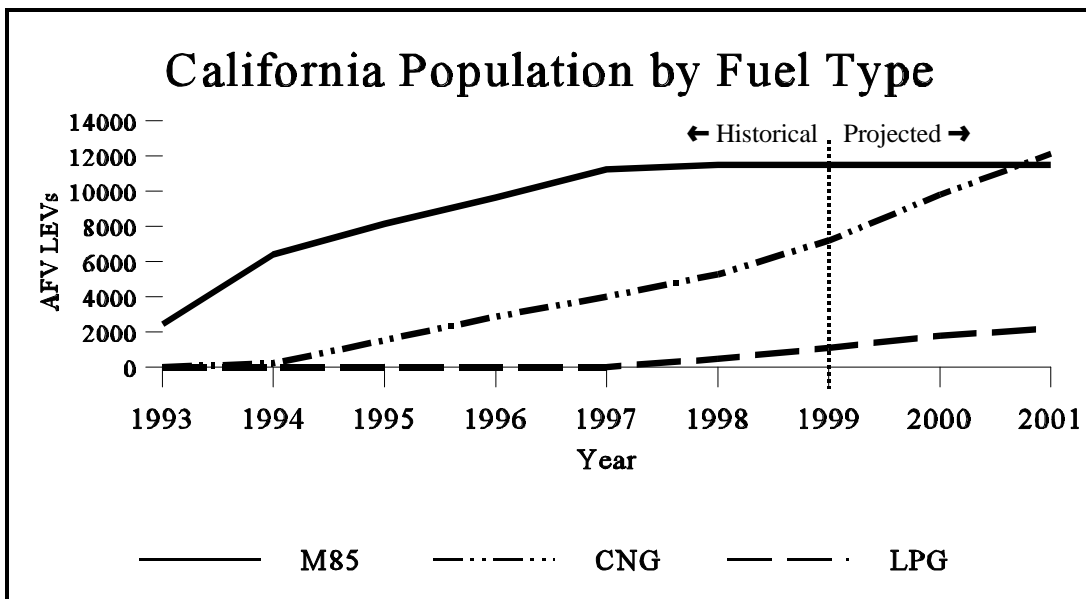
Currently, most alternative fuel LEVs have been produced and marketed to meet the needs of fleet operators. These vehicles are generally fueled at central locations with few vehicles utilizing public outlets. Figure 1 shows the annual production of alternative fuel LEV vehicles for California. This figure shows that the historical and projected production of alternative fuel LEVs has been inconsistent and no one alternative fuel has become dominant in the LEV vehicle marketplace. Figure 2 shows the cumulative population of alternative fuel LEV vehicles for California. As can be seen from this figure, alternative fuel LEV populations have been slow to develop, and for some fuels have become stagnant. These trends all indicate that it may be some time before enough vehicles certified on any one alternative fuel are produced to reach the 20,000 vehicle trigger.



**Figure 1**  
**Annual Historical and Projected Production of**  
**California Alternative Fuel LEVs**



**Figure 2**  
**Cumulative Historical and Projected Population of**  
**California Alternative Fuel LEVs**



A listing of alternative fuel LEV vehicles by manufacturer and model is given in Appendix B. Currently, only vehicles certified to run on CNG, LPG, and M85 have been certified to the LEV standards in significant numbers. Below is a discussion of each of these alternative fuel vehicle fleets.

#### a. CNG Vehicles

Through the 1999 model year, there are nearly 7,200 LEVs operating on CNG in California. It is projected that the number of CNG LEV vehicles will increase significantly, with about another 4,000 vehicles added to California's vehicle fleet by the end of the 2001 model year. The majority of CNG LEV vehicles already operating in California are passenger cars and medium-duty vehicles that are owned and operated as part of fleets, and are fueled at private refueling facilities. In addition, there is also a significant non-LEV CNG fleet (after-market conversions) operating in California. It is estimated that the fleet-operated vehicles comprise nearly 95 percent of the total CNG vehicle fleet. Given the makeup of the CNG vehicle fleet, it is expected that most new CNG vehicles will continue to be purchased by fleets and continue to be centrally fueled.

#### b. Methanol (M85) Vehicles

As of the 1998 model year, it is not expected that any new M85 vehicles will be produced for sale in California. Currently, it is estimated that there are nearly 11,500 M85 LEV vehicles (comprised solely of passenger cars) operating in the State. However, these vehicles are FFVs, and utilization of the existing M85 fueling infrastructure has been in decline for several years. It appears that the potential for M85 as a significant alternative fuel in future LEV fleets is minimal.

#### c. LPG Vehicles

Currently, very few LEV LPG vehicles operate in California. It is estimated that these vehicles total approximately 1,100 medium-duty LPG LEVs. Similar to CNG, there is a substantial non-LEV LPG fleet in California, with the majority of these being vehicles converted from gasoline to LPG operation.

#### d. Ethanol Vehicles

Manufacturers have begun selling FFVs capable of running on ethanol (E85). These vehicles are designed to operate on a blend of 85 percent ethanol and 15 percent gasoline. However, there are currently no E85 LEV vehicles that would count towards

the clean fuels program because these FFVs are not step-certified -- certified to a more stringent LEV standard using E85 than when using gasoline. While the potential for these vehicles to be step-certified exists, there is no information at this time that automobile manufacturers intend to do so.

## *2. Future Alternative Fuel Low-Emission Vehicle Fleet*

While current alternative fuel LEV vehicles utilize internal combustion engines, it appears that future alternative fuel LEV vehicles will likely include vehicles powered by fuel cells. Fuel cells are mechanisms that convert the chemical energy of hydrogen fuel directly into electricity with a very high efficiency, thereby eliminating the emissions of pollutants associated with combustion engines. The hydrogen used in fuel cell vehicles is obtained either directly from an external source (e.g., as a pure hydrogen fuel) and stored onboard the vehicle as a gaseous fuel, or is derived onboard from another hydrocarbon based fuel (e.g., methanol) through a fuel reformer. Staff believes it is likely that emerging fuel cell technology will be used by automakers to comply with the LEV regulations that require ten percent of their new car sales to be zero-emission vehicles (ZEVs) beginning with the 2003 model year, and will allow partial ZEV credits for some vehicles with extremely low emissions. Fuel cell vehicles will be dedicated alternative fuel vehicles; that is they will operate solely on the alternative fuel. It is uncertain at this time what alternative fuels will be utilized by these vehicles, but current research is focusing on methanol (M100). As research on fuel cells continues, automobile manufacturers may seek to form alliances with oil companies to jointly pursue fuel strategies and the development of fueling infrastructures.

## **C. Status of Existing Alternative Fuels Infrastructure**

Currently, there are very few publicly available alternative fueling facilities in California for motorists. The number is less than five percent of the nearly 11,500 retail gasoline stations in California, and most of these facilities are not open to the public. However, there are a limited number of public fueling facilities in California for CNG, LPG and M85. Below is a summary of the status of the motor vehicle fueling infrastructure for each of these alternative fuels.

### *1. CNG Fueling Infrastructure*

Currently, there are over 200 CNG fueling facilities in California, with nearly 60 percent of these facilities located in Southern California. Most CNG fueling facilities are private or government owned and do not offer unrestricted access to the general public. Table 1 shows the total number of CNG fueling facilities in California by type.

Presently, there are seven fully public fueling facilities which offer unrestricted access. Most other facilities offer limited public access through the use of key cards or by calling ahead. Appendix C shows a listing of the CNG fueling facilities in California.

Over 90 percent of the CNG fueling facilities in California are fast fill which can fuel a vehicle in just a few minutes. Slow-fill fueling facilities tend to be older and can only supply a limited number of vehicles. Also used are small portable fueling systems (fuel makers) that can fuel a vehicle over an extended time (about 8 hours). These are often used by individuals who own a single vehicle and want the convenience of fueling at their home or business location.

**Table 1**  
**CNG Fueling Facilities**

Outlet Type			
Public	Limited Public	Private	Total
7	109	93	209

## *2. Methanol (M85) Fueling Infrastructure*

The infrastructure for delivering methanol fuel to the consumer is quite limited. In California, there are fueling facilities capable of providing M85 (a blend of methanol and 15 percent gasoline). Most of these facilities have been established as part of a demonstration project of the CEC, in cooperation with gasoline refiners. The program was intended to encourage the development of a fueling infrastructure for flexible fuel vehicles capable of using M85. At its peak in 1996-1997, the program reached a high of 54 public fueling facilities. However, currently this number has declined to 38 public fueling facilities, as the use of M85 facilities has decreased. Table 2 shows the total number of M85 fueling facilities in California by type. It is expected that the number of public fueling facilities will be further reduced by January 2000. With manufacturers moving away from M85 as an alternative fuel for flexible fuel vehicles, it is likely that this decrease in the number of fueling facilities will continue. Appendix D presents a listing of the M85 fueling facilities in California.

**Table 2**  
**M85 Fueling Facilities**

Outlet Type			
Public	Limited Public	Private	Total
38	0	25	63

While the use of M85 is decreasing, the use of pure methanol (M100) as a future fuel for fuel cell powered vehicles is very possible. It is unclear at this time if the existing M85 fueling infrastructure could be converted to supply pure methanol to future fuel cell powered vehicles, or if these vehicles will require a new infrastructure to be developed.

### *3. LPG Fueling Infrastructure*

LPG is used for commercial/industrial applications, recreational use and as motor vehicle fuel. Because the amount of LPG used in motor vehicle applications is small (less than 10 percent of total LPG use), most LPG fueling facilities are not designed solely for dispensing LPG into motor vehicles. Currently, there are more than 275 LPG fueling facilities in California. Table 3 shows the total number of LPG fueling facilities in California by type. Most of these facilities have public access, although access may be limited and the customer may be required to call ahead to arrange use. Appendix E presents a listing of the LPG fueling facilities in California.

**Table 3**  
**LPG Fueling Facilities**

Outlet Type				
Public	Limited Public	Private	Unknown	Total
107	116	0	55	278

### *4. Ethanol Fueling Infrastructure*

Currently, there is no fueling infrastructure for E85 in California. It is unclear when an E85 fueling infrastructure will be developed. Since current and anticipated E85 vehicles are flexible fuel, there may be little incentive to run them on E85.

## **IV.**

### **PROPOSED AMENDMENTS**

This chapter provides the description and rationale for the proposed amendments to the Clean Fuels Regulations. This summary is intended to satisfy the requirements of Government Code section 11346.2(a)(1), which requires that a noncontrolling plain English summary of the regulations be made available to the public.

#### **A. Eliminate Obsolete Sections**

The proposed amendments would repeal the sections of the Clean Fuels Regulations that are specific to the SCAQMD for the years 1994 through 1996. These sections were developed with the expectation that large numbers of alternative fuel LEVs would be produced and delivered to California during the early years of the program. These sections were never implemented and are obsolete and no longer applicable within the regulations. The sections proposed for repeal include 2301, 2304(a)(2), 2304(a)(5)(A), and 2305.

#### **B. Calculation of the Required Number of Clean Fuel Outlets**

The proposed amendments would modify how the number of clean fuel outlets required each year would be determined. These amendments are to ensure that the Clean Fuels Regulations accurately account for fleet-operated vehicles, consider existing public alternative fueling facilities and retain the original intent of the regulations to require a significant introduction of clean fuel outlets during the program's early years. Further discussion is presented below, and a more detailed discussion of the potential effects of the proposed amendments in comparison to the existing regulations in determining the required number of clean fuel outlets is presented in Appendix F.

##### *1. Calculation of Vehicle Trigger*

It is proposed that the 20,000 vehicle trigger calculation be amended to discount fleet operated vehicles by 75 percent. A fleet would be defined as 15 LEV vehicles operated on the same fuel under the same operation or ownership. The proposed amendments would authorize the ARB Executive Officer to reduce this discount if information indicates that the discount should be less. In addition, any person or organization may request the ARB Executive Officer to revise the trigger calculation or fleet vehicle discount based on additional information.

The rationale for discounting fleet vehicles for purposes of the vehicle trigger is based on information indicating that alternative fuel fleet vehicles do not frequently use retail fueling facilities. According to a U.S. Department of Energy (U.S. DOE) report, *Perspectives on AFVs: State and City Government Fleet Manager Survey*, fleet vehicles are typically fueled on-site or at private fueling facilities about 50 percent of the time. For the remainder 50 percent of the time, these vehicles are fueled at “public” facilities. However, this study considered facilities such as card key-type facilities as “public” facilities. Neither the existing Clean Fuels Regulations nor the proposed amendments recognize these types of facilities as retail clean fuel outlets since consumers must prearrange use of these facilities with the station owner. Thus, the actual frequency that LEV fleet vehicles would utilize retail clean fuel outlets is less than the 50 percent reported in the U.S. DOE report, and is probably closer to 5 to 30 percent, based on the number of retail public fueling facilities for alternative fuels. Therefore, it is estimated that the frequency of fleet vehicles that are fueled at on site or private facilities is closer to about 75 percent.

The existing regulations consider equally the contribution towards the vehicle trigger of both fleet and non-fleet vehicles. However, when determining the number of clean fuel outlets required, the number is effectively reduced by excluding the fuel demand of fleet vehicles not fueled at retail facilities. Since fleet vehicles generally provide their own fueling infrastructure and will not utilize public fueling facilities with the same frequency as non-fleet vehicles, it is more appropriate to discount up-front the contribution of fleet vehicles towards the vehicle trigger. However, there is a potential for fleet vehicles to increase their use of public fueling facilities in the future. Therefore, it is appropriate to allow the ARB Executive Officer to reduce the discount of fleet vehicles counted towards the vehicle trigger if information indicates that the discount should be less. In addition, the proposed amendments would allow any person or organization to request the ARB Executive Officer to consider additional information regarding the fleet vehicle discount or trigger determination. This is discussed in further detail in Section C of this chapter. The proposed amendment to discount fleet vehicles may result in a delay of the initial requirement for new clean fuel outlets by an unknown amount of time.

## *2. Calculation of LEV Fuel Volume Demand*

The proposed amendments would also change the way clean fuel used for fleet vehicles is considered in the LEV clean fuel demand calculation. Instead of determining the clean fuel volume for LEVs at non-retail facilities and subtracting that from the total clean fuel demand for all LEVs operating on the clean fuel, the proposed amendments would have the Executive Officer subtract the total volume of the clean fuel used in fleet vehicles, multiplied by the discount factor identified for the trigger determination. This should make the calculations more predictable and straightforward.

The existing regulations reduce the total clean fuel demand by 10 percent to account for FFVs and dual-fuel vehicles. Since it is difficult to predict the fueling frequencies of these vehicles several years in advance, it is proposed not to discount their contribution to the LEV clean fuel demand. This could result in an increase in the required number of clean fuel outlets compared to the existing regulations.

### *3. Clean Fuel Outlet Throughput*

The proposed amendments would change the specified clean fuel outlet throughput for 1997 and subsequent years, which is used to convert the LEV clean fuel demand to the number of clean fuel outlets required. Under the proposal, an average annual outlet throughput of 300,000 gasoline equivalent gallons (geg) would be used to determine the number of clean fuel outlets. This is proposed to maintain the original intent of the regulations to provide a quick buildup of the fueling infrastructure by requiring more clean fuel outlets during the initial stages of the program. The average annual outlet throughput would be increased to 600,000 geg when five percent of the retail gasoline stations in the State have been equipped to dispense a particular clean fuel.

The existing regulations specify an average annual outlet throughput of 300,000 geg for the years 1994-1996 to determine the required number of clean fuel outlets. This level was chosen to both expedite the introduction of new clean fuel outlets during these years, and provide a reasonable throughput that would make the outlet both profitable for the operator and provide a reasonable rate of return on investments in fuel dispensing and storage equipment. For years 1997 and after, the existing regulations raised the average annual outlet throughput to 600,000 geg to allow for a slower rate of siting new clean fuel outlets. Thus, the proposed amendments would effectively double the number of clean fuel outlets required in the early years by lowering the average annual outlet throughput.

### *4. Existing Public Fueling Outlets*

Under the proposal, the Executive Officer would subtract existing public alternative fueling facilities meeting the amenity requirements and not owned by affected parties from the number of required clean fuel outlets to determine the number of new clean fuel outlets that need to be sited. This provision is similar to the provisions in the existing regulations that apply only to CNG fueling facilities (section 2304(a)(5)(B)). This proposal would allow the ARB staff to recognize existing public alternative fueling facilities for other fuels and account for their ability to meet the clean fuel demand, thereby reducing the burden to affected parties of siting new outlets or having to constructively allocate these existing public facilities. Existing public alternative fueling facilities subtracted from the number of clean fuel outlets required would not be eligible for



constructive allocation by affected parties. However, affected parties would continue to be given credit both for the early introduction of clean fuel outlets and any existing clean fuel outlets already sited under the regulations. It is expected that this proposed amendment should not discourage fuel suppliers from entering into partnerships with auto manufacturers prior to the implementation of the regulations.

#### *5. Notification to Affected Parties of Clean Fuel Outlet Requirements*

In order to streamline the notification process to affected parties, the amendments would modify the timing of the ARB staff's notification regarding clean fuel outlet requirements. The ARB staff would be required to notify interested parties 16 months (by August 31) before the year in which the vehicle trigger is predicted to be reached. This would be a one time notification that the vehicle trigger is expected to be reached for a clean fuel. This notification would include the number of LEV vehicles expected to be operating on a clean fuel, and the discount applied to fleet operated vehicles.

The ARB staff would also issue an annual notification regarding clean fuel outlet requirements to affected parties by October 31 of each year. In order to provide the same 18 months for planning and installation of new clean fuel outlets that the regulations currently provide, new clean fuel outlets would have to be operational by May 1 of the year the trigger is predicted to be met. Under the proposal, affected parties would submit their initial plans for compliance to the ARB within six months of the ARB staff's notification of clean fuel outlet requirements. Final compliance plans would be required three months later.

Currently, the ARB staff is required to notify affected parties twice annually (by June 30 and December 31) as to the need to site clean fuel outlets. This proposal would simplify the clean fuel outlet notification process by reducing it to once per year and should have little affect on the advanced notification for clean fuel outlets. Affected parties will continue to have a total of 18 months from the time the notification is made to have the fueling outlets operational. The existing regulations require new clean fuel outlets to be operational by January 1 of the year the trigger is predicted to be met. The proposed timing changes would allow affected parties and the ARB staff to better determine where vehicles will be located, thereby ensuring outlets are sited in appropriate locations to meet the vehicle fuel demand.

#### **C. Modification of Fleet Vehicle Discount and Required Number of Clean Fuel Outlets by the Executive Officer**

The proposal would add new provisions allowing the ARB Executive Officer to reduce the fleet vehicle discount in the calculation of the vehicle trigger and to adjust the

calculated number of clean fuel outlets up or down based on evidence that the calculated number of clean fuel outlets do not appropriately reflect the fueling demand. This would allow the ARB Executive Officer to consider information regarding the likelihood of vehicles to utilize a particular clean fuel, and the fueling patterns of fleet vehicles and their potential to expand their operational range by using public clean fuel outlets. The existing regulations offer no flexibility in the calculation of new clean fuel outlets or for the consideration of fleet fueling patterns in the vehicle trigger.

### *1. Modification of Fleet Discount*

The proposed amendments would allow the ARB Executive Officer to reduce the fleet vehicle discount in the vehicle trigger calculation from 75 percent if information indicates that the discount should be less. The proposed amendments would also allow any person or organization to request the ARB Executive Officer to consider additional information regarding the discount provided for fleet operated vehicles. Requests for adjustment of the fleet vehicle discount or the trigger determination would need to be submitted to the ARB Executive Officer no later than 30 days after notification is made that the vehicle trigger will be met. The ARB Executive Officer would make changes, if appropriate, to the fleet vehicle discount no later than 30 days from receipt of the request for adjustment.

### *2. Modification of the Required Number of Clean Fuel Outlets*

After the trigger is met, the proposed amendments would also allow the ARB Executive Officer to adjust the number of clean fuel outlets that would be required, within a maximum and a minimum number of clean fuel outlets. The maximum level would be based on the LEV clean fuel demand for all clean fuel LEVs operating on the clean fuel without discounting the fleet vehicles. The minimum level would be based on the LEV clean fuel demand for only the dedicated fuel vehicles in non-fleet use.

While ARB staff will make every effort to provide an accurate determination of the clean fuel outlets required, the proposed amendments would also allow any person or organization to request the ARB Executive Officer to consider additional information regarding the clean fuel outlet determination made by the Executive Officer. This would provide a mechanism by which the ARB Executive Officer could further adjust the number of clean fuel outlets required within the maximum or minimum levels. Requests for adjustment of the number of clean fuel outlets required would need to be submitted to the ARB Executive Officer no later than 30 days after the clean fuel outlet determination is made. The ARB Executive Officer would make changes, if appropriate, to the clean fuel outlet determination no later than 30 days from receipt of the request for adjustment.

#### **D. Reporting Requirements**

In order to reduce reporting requirements for industry, the proposal would delay reporting from retail gasoline outlet owners/operators, fleet operators, clean fuel distributors until such time the information is needed to implement the regulations. Currently, the regulations require reporting of this information annually from retail gasoline outlet owners/operators and fleet operators, and quarterly from clean fuel distributors. It is anticipated that this information will not be needed until the ARB staff determines that the vehicle trigger will likely be met. Therefore, this proposed amendment would allow the ARB staff to collect this information closer to the time it is determined that the vehicle trigger will likely be met.

#### **E. Amenity Requirements**

The proposed amendments would change the amenity requirements to allow more existing public and private alternative fueling facilities to qualify as clean fuel outlets, which should reduce the costs of compliance with these regulations. The proposed changes would modify the amenity requirements by creating two sets of standards for clean fuel outlets. One set of standards would apply to retail gasoline outlets dispensing a designated clean fuel, and the other set would apply to clean fuel outlets that do not offer gasoline for retail sale. For retail gasoline outlets dispensing a designated clean fuel, we are proposing that the clean fuel dispensing equipment have the same amenities as provided for the gasoline dispensing equipment. In lieu of having an attendant trained in the operation of the clean fuel dispensing equipment, a retail gasoline operator may post, in a conspicuous and convenient location, directions illustrating the use of the clean fuel dispensing equipment.

For clean fuel outlets located at non-retail gasoline outlets, it is proposed that the clean fuel dispensing equipment be readily accessible from main highways and streets during normal business hours without use of a key or a card to the public. If the site is unattended, there must be a means for a customer to pay for his fuel purchase without having to arrange for an account with the outlet owner. If the site is operational at night, sufficient lighting must be provided for safety. The outlet operator must also post, in a conspicuous and convenient location, directions illustrating the use of the clean fuel dispensing equipment.

The proposed amendments would require that both retail gasoline clean fuel outlets and clean fuel outlets located at non-retail gasoline outlets be located geographically near the existing and anticipated area of operation of the LEV clean fuel vehicles.

## **F. Sunset Provisions**

The proposal would add a sunset provision for each clean fuel when 10 percent of the retail gasoline outlets in the State have made an individual clean fuel available for purchase. Currently, the regulations do not have an end point in terms of when the fueling infrastructure should be sufficient to no longer require siting of new outlets. According to a recent report by the Oakridge National Laboratory, Center for Transportation Analysis, consumers will be relatively unconcerned about the availability of an alternative fuel if the fuel is available at a minimum of 10 to 20 percent of the retail service outlets. These conclusions were based on evidence gained during the introduction of diesel powered automobiles in the early 1980's, as well as data on the introduction of CNG and LPG bi-fuel vehicles in New Zealand. As such, this proposal would sunset the provisions for siting new clean fuel outlets when 10 percent of the retail gasoline outlets in the State have made a particular clean fuel available for sale to the public. Based on the current figure of about 11,000 retail gasoline stations in the State, 10 percent of these stations is 1,100 clean fuel outlets.



## **V.**

### **ENVIRONMENTAL AND ECONOMIC IMPACTS**

This chapter summarizes the environmental and economic impacts associated with the proposed amendments to the Clean Fuels Regulations.

#### **A. Environmental Impacts**

The proposed amendments could delay the initial requirement for owners/lessors of retail gasoline outlets to site new clean fuel outlets. However, the Clean Fuels Regulations were adopted solely in support of the LEV program and no specific emission benefits can be associated with these regulations. Additionally, during the early years of the program, once the vehicle trigger is reached, more clean fuel outlets will be required than under the existing regulations. However, over the life of the clean fuels program, the proposed amendments will not increase the total number of clean fuel outlets required than under the existing regulations. As such, the proposed amendments should not result in any adverse environmental impact.

#### **B. Cost Impacts**

In general, the proposed amendments should reduce the overall costs of compliance to affected retail gasoline owners/lessors. By discounting that portion of the alternative fuel LEVs that are fleet operated, the date that the 20,000 vehicle trigger will be met would likely be delayed. Also, by delaying the reporting requirements to retail gasoline outlet owners/lessors, fleet operators and clean fuel distributors, the associated costs of reporting should be significantly reduced in the years prior to the trigger being met.

Staff expects that a cost savings should be realized by the relaxation of the amenity requirements, thereby allowing more existing facilities to qualify as clean fuel outlets. In addition, by subtracting any existing public alternative fueling facilities from the number of clean fuel outlets required each year, the number of new clean fuel outlets that are required could be less than that required under the existing regulations. This should reduce the burden on affected owners/lessors that are required to site new clean fuel outlets. Also, the proposed amendments contain sunset provisions that would eliminate the Clean Fuels Program for a particular fuel when ten percent of the retail gasoline outlets in the State offer that fuel for retail sale.

**C. Small Business Impacts**

The Government Code requires the ARB to discuss how complying with a proposed regulation could adversely affect small businesses. (Small businesses are defined by Government Code Section 11342 *et seq.*) We believe that adoption of the proposed amendments would not result in any significant adverse impacts on small businesses.

**D. Global Warming and Ozone Depletion Impacts**

The proposed amendments to the Clean Fuels Regulations are not expected to increase emissions of greenhouse gases that may contribute to global warming or pollutants that may contribute to stratospheric ozone depletion.

## REFERENCES

1. California Air Resources Board, *Proposed Regulations for Low-Emission Vehicles and Clean Fuels*, Final Statement of Reasons, Sacramento, CA, July 1991, Chapters II - III.
2. California Energy Commission, personal communication with Air Resources Board staff, March 9, 1999.
3. Green, David L., "Survey Evidence on the Importance of Fuel Availability to the Choice of Alternative Fuels and Vehicles," *Energy Studies Review*, Vol. 8, No. 3, 1998, pp. 215-231.
4. Kalhammer, Fritz R., Prokopous, Paul R., Roan, Vernon P., and Voecks, Gerald E., *Status and Prospects of Fuel Cells as Automobile Engines: A Report of the Fuel Cell Technical Advisory Panel*, Contract Nos. 96-602, 96-609, 96-610, and 96-611, California Air Resources Board, Sacramento, CA, July 1998, pp. 59-67.
5. "Market Facts 1998," *National Petroleum News*, Mid-July 1998, p. 124.
6. Vlasek, Gregory E., personal communication with Air Resources Board staff, February 23, 1999.
7. Whalen, M., Coburn, T., Eudy, L., *Perspectives on AFVs: State and City Government Fleet Manager Survey*, NREL/TP-540-23980, U.S. Department of Energy, National Renewable Energy Laboratory, Golden, CO, February 1999, pp. 16, A-2.



## APPENDIX A

### **PROPOSED REGULATION ORDER**

## APPENDIX B

### **ALTERNATIVE FUEL LOW-EMISSION VEHICLES DELIVERED FOR SALE IN CALIFORNIA**

**Compressed Natural Gas  
Low Emission Vehicle Offerings**

Model Year	Company	Model	Certification Standard	Fuel Type	Vehicle type
1994	Chrysler	Caravan/Voyager	ULEV	Dedicated	Light-Duty Truck
1995	Chrysler	Caravan/Voyager	ULEV	Dedicated	Light-Duty Truck
		Ram	ULEV	Dedicated	Medium-Duty Vehicle
	Ford	F-Series	LEV	Bi-fuel	Medium-Duty Vehicle
1996	Chrysler	Caravan/Voyager	ULEV	Dedicated	Light-Duty Truck
		Ram	ULEV	Dedicated	Medium-Duty Vehicle
	Ford	Crown Victoria	ULEV	Dedicated	Passenger Car
1997	Chrysler	Ram	ULEV	Dedicated	Medium-Duty Vehicle
	Ford	Crown Victoria	ULEV	Dedicated	Passenger Car
		Contour	LEV	Bi-fuel	Passenger Car
		Econoline	SULEV	Dedicated	Medium-Duty Vehicle
		F-Series	SULEV	Dedicated	Medium-Duty Vehicle
	IMPCO/GM	Chevy/GMC Sierra	LEV	Bi-fuel	Medium-Duty Vehicle
1998	Ford	Contour	LEV	Bi-fuel	Passenger Car
		Crown Victoria	ULEV	Dedicated	Passenger Car
		Econoline	LEV	Bi-fuel	Medium-Duty Vehicle
			SULEV	Dedicated	Medium-Duty Vehicle
		F-Series	LEV	Bi-fuel	Medium-Duty Vehicle
			SULEV	Dedicated	Medium-Duty Vehicle
	Honda	Civic	ULEV	Dedicated	Passenger Car
	IMPCO/GM	Cavalier	TLEV	Bi-fuel	Passenger Car
1999	Chrysler	Ram	SULEV	Dedicated	Medium-Duty Vehicle
	Ford	Contour	LEV	Bi-fuel	Passenger Car
		Crown Victoria	ULEV	Dedicated	Passenger Car
		Econoline	LEV	Bi-fuel	Medium-Duty Vehicle
			SULEV	Dedicated	Medium-Duty Vehicle
		F-Series	LEV	Bi-fuel	Medium-Duty Vehicle
			SULEV	Dedicated	Medium-Duty Vehicle
	Honda	Civic	ULEV	Dedicated	Passenger Car
	IMPCO/GM	Cavalier	LEV	Bi-fuel	Passenger Car
	Toyota	Camry	ULEV	Dedicated	Passenger Car

**Methanol (M85)**  
**Low Emission Vehicle Offerings**

Model Year	Company	Model	Certification Standard	Fuel Type	Vehicle type
1993	GM	Lumina	TLEV	Flexible Fuel	Passenger Car
	Ford	Taurus	TLEV	Flexible Fuel	Passenger Car
1994	Chrysler	Spirit	TLEV	Flexible Fuel	Passenger Car
	Ford	Taurus	TLEV	Flexible Fuel	Passenger Car
1995	Chrysler	Intrepid	TLEV	Flexible Fuel	Passenger Car
	Ford	Taurus	TLEV	Flexible Fuel	Passenger Car
1996	Ford	Taurus	TLEV	Flexible Fuel	Passenger Car
1997	Ford	Taurus	TLEV	Flexible Fuel	Passenger Car
1998	Ford	Taurus	TLEV	Flexible Fuel	Passenger Car
1999	Ford	Taurus	TLEV	Flexible Fuel	Passenger Car

**Liquified Petroleum Gas (LPG)**  
**Low Emission Vehicle Offerings**

Model Year	Company	Model	Certification Standard	Fuel Type	Vehicle type
1993	Ford	F-Series	LEV	Flexible Fuel	Medium-Duty Vehicle
		Econoline	LEV	Flexible Fuel	Medium-Duty Vehicle
1994	Ford	F-Series	LEV	Flexible Fuel	Medium-Duty Vehicle
		Econoline	LEV	Flexible Fuel	Medium-Duty Vehicle

**Ethanol (E85)**  
**Low Emission Vehicle Offerings**

Model Year	Company	Model	Certification Standard	Fuel Type	Vehicle type
1999	Ford	Taurus	LEV	Flexible Fuel	Passenger Car
		Ranger	TLEV	Flexible Fuel	Medium-Duty Vehicle

## APPENDIX C

### **COMPRESSED NATURAL GAS (CNG) FUELING FACILITIES IN CALIFORNIA**

## APPENDIX D

### **METHANOL (M85) FUELING FACILITIES IN CALIFORNIA**

## APPENDIX E

### **LIQUEFIED PETROLEUM GAS (LPG) FUELING FACILITIES IN CALIFORNIA**

## Appendix F

### **POTENTIAL EFFECTS OF THE PROPOSED AMENDMENTS TO THE CLEAN FUELS REGULATIONS**



## **POTENTIAL EFFECTS OF THE PROPOSED AMENDMENTS TO THE CLEAN FUELS REGULATIONS**

Appendix F illustrates the potential effects of the proposed amendments in comparison to the existing regulations. It is anticipated the proposed amendments will both delay the siting of new clean fuel outlets and require a greater number of clean fuel outlets to be sited once the vehicle trigger is reached. The length of the delay in siting and the amount of the increase in the number of new clean fuel outlets is dependent on what percentage of the LEV vehicle population is comprised of fleet vehicles for the given clean fuel, and how much of the fleet population is discounted in the vehicle trigger calculation. These variables, more than any other factors, influence when the vehicle trigger is met and the difference in the calculated number of clean fuel outlets required between the existing regulations and the proposed amendments to the Clean Fuels Regulations.

Appendix F provides detailed calculations of the required number of clean fuel outlets both for the existing and proposed regulations for a given hypothetical population of LEV M85 vehicles (Table F1). In Table F1, un-italicized numbers represent the vehicle counts under the existing regulations, and italicized numbers represent the vehicle counts under the proposed amendments that account for discounting fleet vehicles (Fleets have been discounted by the maximum of 75 percent in this example to illustrate the worst-case scenario regarding a delay in reaching the vehicle trigger). Section A illustrates how the number of clean fuel outlets required would be calculated under the existing regulations. Section B shows how the number of clean fuel outlets required would be calculated under the proposed amendments. Both examples assume that there are no LEV vehicle conversions and that fleets comprise 45 percent of the vehicle population. The results of Sections A and B are graphed for comparison purposes in Figure F1, Section C.

In order to further illustrate the effects of fleet vehicles on the determination of the number of clean fuel outlets, Section C shows the calculated number of clean fuel outlets required for different percentages of fleet vehicles comprising the LEV vehicle population. As in the example in Section B, fleets have been discounted by the maximum of 75 percent. The same hypothetical M85 vehicle counts shown in Table F1 were utilized to calculate the results shown in Figures F2 through F4.

**It should be noted that the following figures and results are hypothetical. The hypothetical vehicle counts used, and the fleet assumptions made, are not representative of any actual data currently available to the ARB. These calculations are for illustrative purposes only, and any actual delays in siting new clean fuel outlets, and any increases in the calculated number of clean fuel outlets required, would be different from the results shown in Appendix F.**

**Table F1**

**HYPOTHETICAL VEHICLE COUNTS  
APPLIED TOWARDS VEHICLE TRIGGER CALCULATION <sup>12</sup>**

Model Year	Passenger Cars Sold <i>(Proposed Amendments)</i>	Light-Duty Trucks Sold <i>(Proposed Amendments)</i>	Medium-Duty Vehicles Sold <i>(Proposed Amendments)</i>	Annual Total <i>(Proposed Amendments)</i>	Commutative Total <i>(Proposed Amendments)</i>
1996	500 <i>(331)</i>	300 <i>(199)</i>	0 <i>(0)</i>	800 <i>(530)</i>	800 <i>(530)</i>
1997	700 <i>(464)</i>	600 <i>(398)</i>	0 <i>(0)</i>	1,300 <i>(862)</i>	2,100 <i>(1,392)</i>
1998	1,000 <i>(663)</i>	900 <i>(596)</i>	0 <i>(0)</i>	1,900 <i>(1,259)</i>	4,000 <i>(2,651)</i>
1999 <sup>1</sup>	5,000 <i>(3,313)</i>	600 <i>(398)</i>	100 <i>(66)</i>	5,700 <i>(3,777)</i>	9,700 <i>(6,428)</i>
2000	8,000 <i>(5,300)</i>	2,000 <i>(1,325)</i>	500 <i>(331)</i>	10,500 <i>(6,956)</i>	20,200 <i>(13,384)</i>
2001 <sup>3</sup>	8,000 <i>(5,300)</i>	2,000 <i>(1,325)</i>	500 <i>(331)</i>	10,500 <i>(6,956)</i>	30,700 <i>(20,340)</i>
2002 <sup>3</sup>	8,000 <i>(5,300)</i>	2,000 <i>(1,325)</i>	500 <i>(331)</i>	10,500 <i>(6,956)</i>	41,200 <i>(37,296)</i>
2003 <sup>3</sup>	8,000 <i>(5,300)</i>	2,000 <i>(1,325)</i>	500 <i>(331)</i>	10,500 <i>(6,956)</i>	51,700 <i>(34,252)</i>
2004 <sup>3</sup>	8,000 <i>(5,300)</i>	2,000 <i>(1,325)</i>	500 <i>(331)</i>	10,500 <i>(6,956)</i>	62,200 <i>(41,208)</i>
Grand Totals	39,200 <i>(31,271)</i>	10,400 <i>(8,216)</i>	2,100 <i>(1,721)</i>		62,200 <i>(41,208)</i>

<sup>1</sup> The un-italicized numbers in this table would be based on the actual vehicle production provided by automobile manufacturers.

<sup>2</sup> The italicized numbers in this table would be the vehicle trigger counts as would be prescribed under the proposed amendments (fleets discounted by maximum value of 75 percent), assuming 45 percent of the vehicles produced would be fleet vehicles.

<sup>3</sup> Estimates for these years would be based on figures provided by automobile manufacturers

## A. Example Calculation Using the Existing Clean Fuels Regulations

With this hypothetical situation, the vehicle trigger would be met in the year 2000 with 20,200 M85 LEV vehicles operating in the State (see Table F1). In order to determine the number of M85 clean fuel outlets required, it will first be necessary to calculate the total projected maximum clean fuel volume (TPMV) for M85. Under section 2303(c), the TPMV is calculated as:

$$TPMV_{M85} = \sum_{MY_y} [ \sum_{VehCl_i} MXDV(VehCl_i, MY_y) ]$$

Where:

<i>TPMV</i>	=	The total projected maximum clean fuel volume.
<i>MXDV</i> <sub>(i, y)</sub>	=	The maximum demand fuel volume for a particular clean fuel within a vehicle class <i>i</i> and model year <i>y</i> .
<i>VehCl<sub>i</sub></i>	=	The vehicle classification. The following three vehicle classifications covered by these regulations: passenger cars, light duty trucks, and medium duty vehicles.
<i>MY<sub>y</sub></i>	=	The vehicle model year for each vehicle model year since and including 1994.

In order to calculate the TPMV, it is first necessary to calculate the maximum demand fuel volume (MXDV) for each vehicle class for each calendar year from 1996 through 2000. The MXDV for a vehicle class for a given year is calculated as follows:

$$MXDV_{(VehCl_i, MY_y)} = \frac{(\text{num. of vehicles}) \times (\text{AMT per vehicle})}{(\text{avg fuel economy})} \times (\text{Fuel Vol Adj Factor})$$

Where:

<i>MXDV</i>	=	The maximum demand fuel volume for each vehicle class and for each calendar year.
<i>num. of vehicles</i>	=	The number of vehicles certified on a particular clean fuel.
<i>AMT per vehicle</i>	=	The average vehicle miles traveled per year per low-emission vehicle, based on annual mileage accrual rates for motor vehicles for a specific model year and vehicle class derived from ARB's EMFAC emission inventory model.
<i>Avg Fuel Economy</i>	=	The estimated fuel economy provided by vehicle manufacturers in miles (geg) for a vehicle class.

*Fuel Vol. Adj. Factor* = A factor designed to take into consideration that some FFVs will operate on gasoline some of the time. The factor is set at 0.90.

In our example, in model year 1996 there were 500 passenger cars certified to LEV standards on M85 that are counted towards the vehicle trigger. The AMT per vehicle is based on the age of the vehicle. For a 1996 passenger car in the year 2000, the AMT would be 11,742 miles/vehicle and the average fuel economy is 20 mpg (in geg). The calculation of MXDV is as follows:

$$\begin{aligned} \text{MXDV}_{(\text{passenger cars, 1996})} &= [(500 \text{ vehicles}) \times (11,742 \text{ miles/vehicle}) / (20 \text{ miles/gal})] \times (0.90) \\ &= 264,195 \text{ gallons M85} \end{aligned}$$

Similar calculations would be done for each model year and vehicle class. This information is provided in the Table F2 (passenger cars), Table F3 (light-duty trucks) and Table F4 (medium-duty vehicles).

**Table F2**  
**Passenger Cars Maximum Demand Fuel Volume (MXDV)**

Model Year	Number of M85 Vehicles	Average Vehicle Miles Traveled	Average Fuel Economy (geg)	Adjustment Factor	MXDV (gallons)
1996	500	11,742	20	0.90	264,195
1997	700	12,349	20	0.90	388,994
1998	1,000	12,956	20	0.90	583,020
1999	5,000	13,563	20	0.90	3,051,675
2000	8,000	14,169	20	0.90	5,100,840
Total					9,388,724

**Table F3**  
**Light-Duty Trucks Maximum Demand Fuel Volume (MXDV)**

Model Year	Number of M85 Vehicles	Average Vehicle Miles Traveled	Average Fuel Economy (geg)	Adjustment Factor	MXDV (gallons)
1996	300	11,843	18	0.90	177,645
1997	600	12,696	18	0.90	380,880
1998	900	13,610	18	0.90	612,450
1999	600	14,590	18	0.90	437,700
2000	2,000	15,640	18	0.90	1,564,000
Total					3,172,675

**Table F4**  
**Medium-Duty Vehicles Maximum Demand Fuel Volume (MXDV)**

Model Year	Number of M85 Vehicles	Average Vehicle Miles Traveled	Average Fuel Economy (geg)	Adjustment Factor	MXDV (gallons)
1999	100	16,217	16	0.90	91,221
2000	500	17,608	16	0.90	495,225
Total					586,446

The TPMV is for all vehicle classes from 1996 through 2000 would be:

$$\begin{aligned}
 \text{TPMV} &= \text{MXDV}_{(\text{pass. cars, 1996-2000})} + \text{MXDV}_{(\text{LDT, 1996-2000})} + \text{MXDV}_{(\text{MDV, 1999-2000})} \\
 &= 9,388,724 + 3,172,675 + 586,446 \\
 &= 13,147,845 \text{ geg of M85}
 \end{aligned}$$

In section 2304(a)(4), the formula used to determine the required number of clean fuel outlets is described as:

$$\text{Req. CF Outlets} = \frac{\text{TPMV} - \frac{\text{CF Vol @ Non-Retail Facilities}}{\text{Clean Fuel Outlet Throughput}} + \frac{\text{Total CF Vol From Vehicle Conversions}}{\text{Clean Fuel Outlet Throughput}}}{\text{Clean Fuel Outlet Throughput}}$$

<i>Req. CF Outlets</i>	=	The required number of clean fuel outlets.
<i>TPMV</i>	=	Total projected maximum clean fuel volume (calculated above).
<i>CF Vol @ at Non-Retail Facilities</i>	=	The clean fuel volume for low-emission vehicles being supplied at non-retail facilities non-retail facilities. For this example, it is assumed that 45 percent of the fuel will be used in fleet operation (5,916,530 geg).
<i>Total CF Vol From Vehicle Conversions</i>	=	The total amount of the designated clean fuel needed for each vehicle class for vehicle conversions to low-emission vehicles.
<i>Clean Fuel Outlet Throughput</i>	=	The clean fuel throughput volume for liquid fuels is 600,000 gasoline equivalent gallons per year.

$$\begin{aligned} \text{Required number of} &= 13,147,845 \text{ gallons} - 5,916,530 \text{ gallons} + 0 \text{ gallons} \\ \text{M85 Outlets in 2000} &\quad \underline{\quad 600,000 \text{ gallons} \quad} \\ &= 12.05 \end{aligned}$$

The responsibility to equip the 12 outlets would be allocated among affected owner/lessors according to the number of retail gasoline outlets they own/lease within the State. Using the same methods, in the year 2001, 18 M85 outlets would be required.

With this hypothetical situation, after discounting fleets by 75 percent, the vehicle trigger would be met in the year 2001 with 20,340 M85 LEV vehicles counted towards meeting the vehicle trigger (see Table F1, page F-1). In order to determine the number of clean fuel outlets required, it will first be necessary to calculate the total projected maximum clean fuel volume (TPMV) for M85. The TPMV is calculated as:

F-6

Where:

<i>TPMV</i>	=	The total projected maximum clean fuel volume.
<i>MXDV</i> <sub>(i, y)</sub>	=	The maximum demand fuel volume for a particular clean fuel within a vehicle class <i>i</i> and model year <i>y</i> .
<i>VehCl<sub>i</sub></i>	=	The vehicle classification. The following three vehicle classifications covered by these regulations: passenger cars, light duty trucks, and medium duty vehicles.
<i>MY<sub>y</sub></i>	=	The vehicle model year for each vehicle model year since and including 1994.

In order to calculate the total projected maximum clean fuel volume, it is first necessary to calculate the maximum demand volume (MXDV) for each vehicle class for each calendar year from 1996 to 2001. The MXDV for a class of vehicle for a particular year is calculated as follows:

$$MXDV_{(VehCl_p, MY_y)} = \frac{(num. \text{ of vehicles}) \times (AMT \text{ per vehicle})}{(avg \text{ fuel economy})}$$

Where:

<i>MXDV</i>	=	The maximum demand fuel volume for each vehicle class and for each calendar year.
<i>num. of vehicles</i>	=	The number of vehicles certified on a fuel
<i>AMT per vehicle</i>	=	The average mileage accrual rates for motor vehicles for a specific model year and vehicle class derived from ARB's EMFAC emission inventory model.
<i>Avg Fuel Economy</i>	=	The estimated fuel economy in miles per gasoline equivalent gallon for a vehicle class, as provided by vehicle manufacturers.

In this example, for model year 1996 there were 500 M85 LEV passenger cars produced for sale in California. For passenger cars the AMT per vehicle is 11,135 miles/vehicle and the average fuel economy is 20 mpg (in geg). The calculation of MXDV is as follows:

$$\begin{aligned} MXD_{(passenger \text{ cars}, 1996)} &= [(500 \text{ vehicles}) \times (11,135 \text{ miles/vehicle}) / (20 \text{ miles/gal})] \\ &= 278,375 \text{ gallons M85} \end{aligned}$$

Similar calculations would be done for each model year and vehicle class. This information is provided in the Table F5 (passenger cars), Table F6 (light-duty trucks) and Table F7 (medium-duty vehicles).





**Table F5**  
**Passenger Cars Clean Fuel Volume (CFV)**

Model Year	Number of M85 Vehicles	Vehicle Miles Traveled	Average Fuel Economy (geg)	CFV (gallons)
1996	500	11,135	20	278,375
1997	700	11,742	20	410,970
1998	1,000	12,349	20	617,450
1999	5,000	12,956	20	3,239,000
2000	8,000	13,563	20	5,425,200
2001	8,000	14,169	20	5,667,600
Total				15,638,595

**Table F6**  
**Light-Duty Trucks Clean Fuel Volume (CFV)**

Model Year	Num of M85 Vehicles	Vehicle Miles Traveled	Average Fuel Economy (geg)	CFV (gallons)
1996	300	11,048	18	184,133
1997	600	11,843	18	394,767
1998	900	12,696	18	634,800
1999	600	13,610	18	453,667
2000	2,000	14,590	18	1,621,111
2001	2,000	15,640	18	1,737,778
Total				5,026,256

**Table F7**  
**Medium Duty Vehicles Clean Fuel Volume (CFV)**

Year	Num of M85 Vehicles	Vehicle Miles Traveled	Average Fuel Economy (geg)	CFV (gallons)
1999	100	14,937	16	93,356
2000	500	16,217	16	506,781
2001	500	17,608	16	550,250
Total				1,150,388

The TPMV is the total of the clean fuel volumes for all vehicle classes from 1996 through 2001.

$$\begin{aligned}
 \text{TPMV} &= \text{MXDV}_{(\text{pass. cars, 1996 - 2001})} + \text{MXDV}_{(\text{LDT, 1996 - 2001})} + \text{MXDV}_{(\text{MDV, 1999-2001})} \\
 &= 15,638,595 + 5,026,256 + 1,150,388 \\
 &= 21,815,239 \text{ gasoline equivalent gallons of M85}
 \end{aligned}$$

In amended section 2304(a)(1), the formula used to determine the required number of clean fuel outlets is described as:

$$\text{Req. CF Outlets} = \frac{\text{TPMV} - \frac{\text{Discounted CF Volume for Fleet Vehicles}}{\text{Clean Fuel Outlet Throughput}} + \frac{\text{Total CF Vol From Vehicle Conversions}}{\text{Clean Fuel Outlet Throughput}}}{1}$$

Where:

<i>Req. CF Outlets</i>	=	The required number of clean fuel outlets.
<i>TPMV</i>	=	Total projected maximum clean fuel volume (calculated above).
<i>Discounted CF Volume for Fleet Vehicles</i>	=	Total volume of fuel estimated to be used in fleets vehicles, multiplied by the discount factor determined in proposed section 2305.5(a). For this example, it is assumed that 45 percent of the fuel (9,816,858 geg) will be used by fleet vehicles, multiplied by the discount factor (75%).
<i>CF Vol From Vehicle Conversions</i>	=	The total amount of the designated clean fuel needed for vehicle class for vehicle conversions to low-emission vehicles.
<i>Clean Fuel Outlet Throughput</i>	=	The clean fuel throughput volume for liquid fuels is 300,000 gasoline equivalent gallons per year.

In our example, we have assumed that the clean fuel volume for M85 from vehicle conversions is zero.

$$\begin{array}{rcl} \text{Required number of} & = & 21,815,239 \text{ gallons} - (9,816,858 \times 0.75) \text{ gallons} + 0 \text{ gallons} \\ \text{M85 Outlets in 2001} & & 300,000 \text{ gallons} \\ & = & \frac{48.18}{\phantom{000000}} \end{array}$$

*or 48 M85 outlets required.*

The responsibility to equip the 48 outlets would be allocated among affected owner/lessors according to the number of retail gasoline outlets they own/lease within the State. This figure could be modified by any existing clean fuel outlets already sited, as well as by the ARB Executive Officer to account for any discrepancies in assumed public outlet utilization.

### **C. Comparison of the Existing and Proposed Regulations Utilizing Different Percentages of Fleet Vehicles**

Figure F1 compares the results of Example A and B of this appendix through the year 2004. Figures F2 through F4 show three additional scenarios comparing the existing and proposed regulations assuming fleet vehicles comprise anywhere from 30 to 90 percent of the M85 LEV vehicle population shown in Table F1, (fleets are discounted by the maximum discount of 75 percent). As all these figures show, once the vehicle trigger is achieved under the proposed regulations, the rate at which new clean fuel outlets are introduced is accelerated. However, as Figure F4 shows, if a high percentage of the alternative fuel LEV population is comprised of fleet vehicles, the vehicle trigger will be delayed for several years.

Figure F1

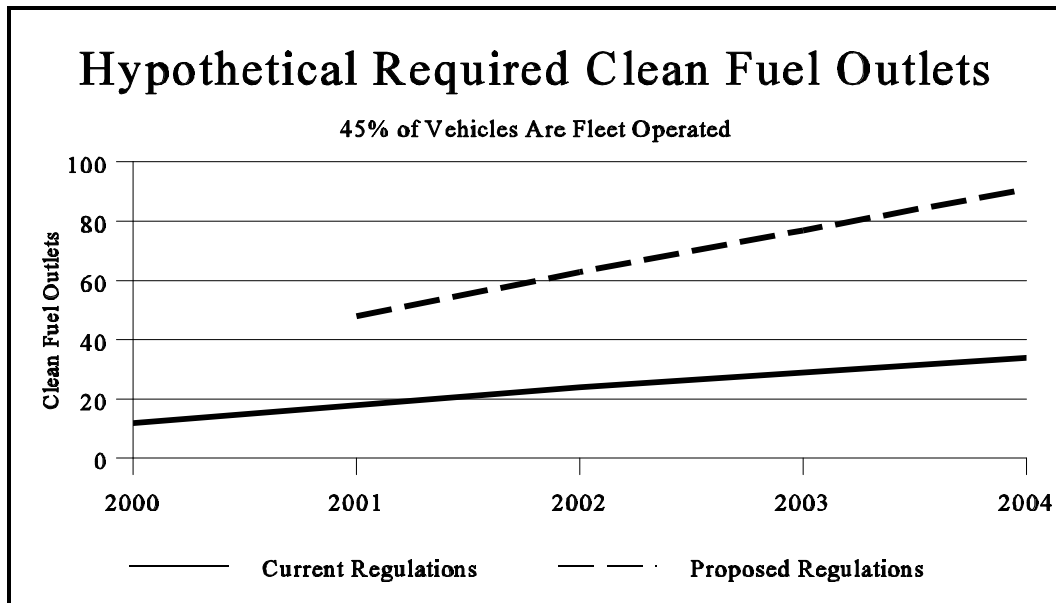


Figure F2

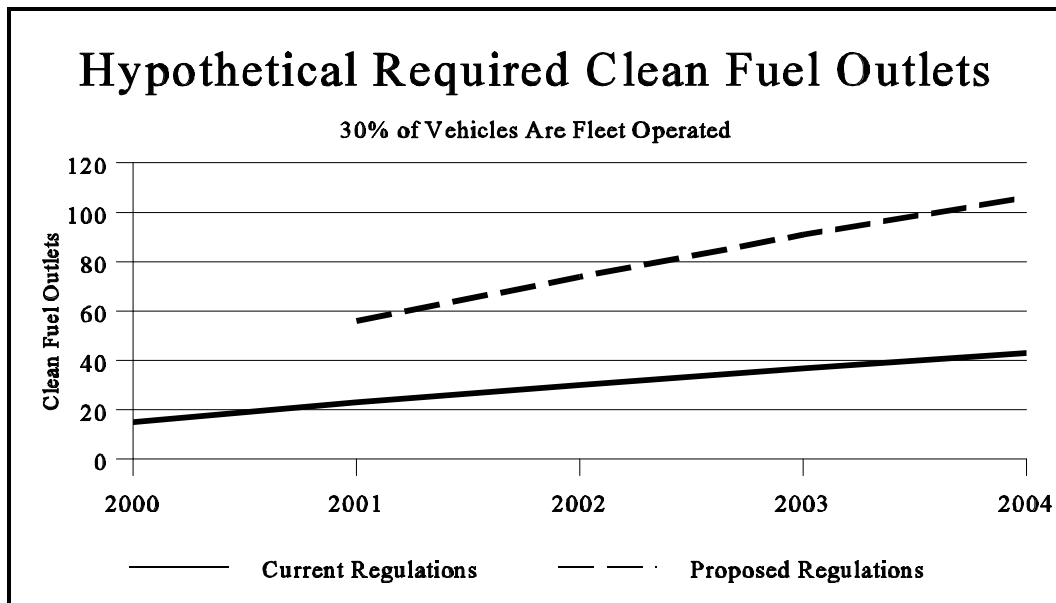


Figure F3

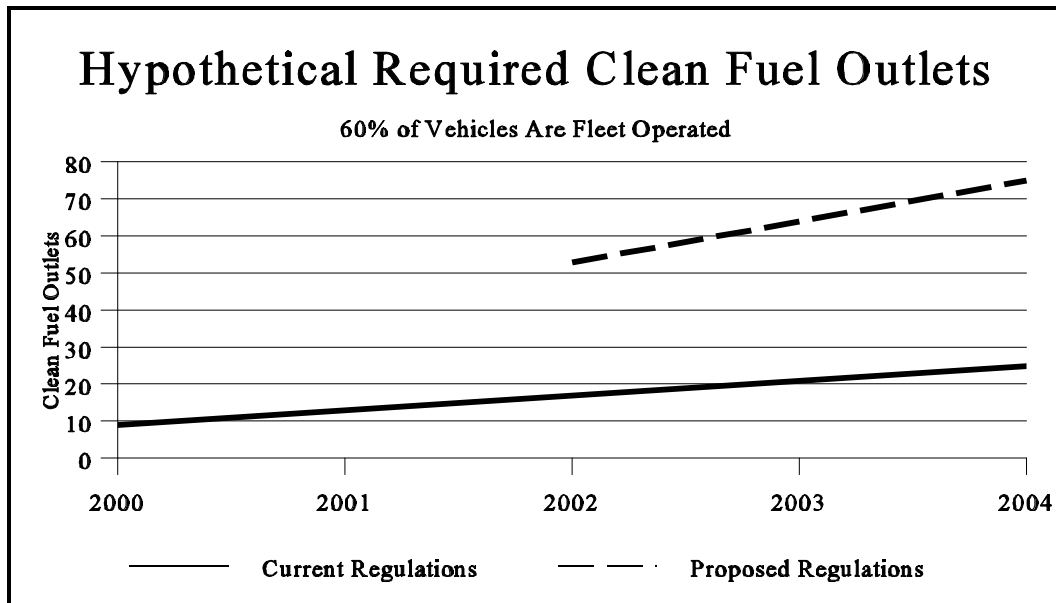


Figure F4

